IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte

Appeal No. _____

Serial No.:	09/867,736
Filed:	May 20, 2001
Group Art Unit:	2615
Examiner:	Lun S. Lao
Applicant:	Chinping Q. Yang
Title:	Audio Post processing in DVD, DTV and Other Audio Visual Products

Cincinnati, Ohio 45202

February 17, 2009
Via EFS-WEB

APPEAL BRIEF

This brief is in furtherance of Applicant's Notice of Appeal filed October 16, 2008, appealing the decision of the Examiner dated April 16, 2008 finally rejecting claims 1-29. A copy of the claims appears in the Appendix to this brief.

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/ Thomas W. Humphrey /	February 17, 2009
Thomas W. Humphrey	Date
Reg. No. 34,353	

Real Party In Interest

The real parties in interest in this appeal are SONY CORPORATION, a Japanese corporation with offices at 7-35 Kitashinagawa 6-Chome, Shinagawa-Ku, Tokyo, Japan, and SONY ELECTRONICS INC., a corporation organized under the laws of the state of Delaware, and having its principal place of business at 1 Sony Drive, Park Ridge, New Jersey 07656

Related Appeals and Interferences

There are no such appeals or interferences.

Status of Claims

Total Number of Claims in the Application

Claims in the application are Claims 1-29:

Status of all the Claims

1. Claims cancelled: NONE

2. Claims withdrawn from consideration but not cancelled: NONE

3. Claims objected to: NONE

4. Claims allowed or confirmed: NONE

5. Claims rejected: 1-29

Claims on Appeal

The claims on appeal are Claims 1-29.

Status of Amendments

There are no amendments pending.

Summary of Background for the Invention

As explained in the background of the present application, modern audio processing equipment, such as home theater receivers, includes post processing circuitry that often must alter the audio input signal from its original format. For instance, a matrixing operation necessarily reformats an input signal by electronically mixing it with another. The process varies the number of channels in the signal, fundamentally altering the original signal. Likewise, a VES application purposely manipulates the audio signal to create the desired 3D audio image using only two front speakers. The VES processing includes digital filtering, mixing an input signal with another, and further interjects delays and attenuation. Such manipulations represent dramatic departures from the content and format of the original signal.

Latent distortions impact subsequent processes. Because such processes begin with an altered signal, some exacerbate distorting properties introduced by a preceding technique in the course of applying their own algorithms. Such distortions are sampled, magnified and reproduced at exaggerated levels such that they influence subsequent processing and become perceptible to the listener.

For instance, executing a summing VES algorithm prior to applying a bass management technique results in a "tinny," hollow sound. Further, following a center channel equalizer application with an enhanced surround sound algorithm can introduce filter overflow. Such overflow precipitates the clipping of audio portions from the signal. The clipped signal may sound "choppy," disjointed and be unrepresentative of the original signal. Time delays and

attenuations associated with DCS or Prologic applications can introduce noise into a post

processing effort. Such noise manifests in static, granularity and other sound degradation.

Undesirable distorting effects are further compounded in playback systems that stack

several post processing algorithms. In such systems, an input signal may be altered substantially

before being processed by a final algorithm. The integrity of the resultant signal is compromised

by clipping and noise complications.

Therefore, there is a significant need for a method of coordinating multiple algorithms

within a single post processing effort without sacrificing audio signal integrity. The invention

addresses this need.

Summary of Claimed Subject Matter as to Independent Claim 1

Claim 1 recites an audio post processing method, generally shown in Fig. 4 and described in the specification at pages 13-21. Namely, "matrix mixing" such as downmixing or Prologic algorithms, are first applied (step 32 or 34) to achieve channel parity. Then, and only thereafter, enhanced surround sound programming (step 40) performs a step of "decoding a surround channel of the matrix mixed audio signal". A "low frequency input channel" is output to a "low frequency effect compatible speaker" (step 46), and an "ambient noise-containing channel" is delivered to a speaker system to create a "three dimensional effect" (step 52), and a "center channel" is equalized from the "matrix mixed audio signal" (step 60).

By observing proper order in the processing steps, identified as a "sequenced process" in the language of claim 1, the post processing proceeds without becoming "tinny", "hollow", "clipped", or "choppy," or evidencing unwanted time delays, static, granularity and other sound degradation.

Summary of Claimed Subject Matter as to Independent Claim 10

Claim 10 recites an audio post processing method, generally shown in Fig. 4 and described in the specification at pages 13-21. Namely, "matrix mixing" such as downmixing or Prologic algorithms, is first performed (step 32 or 34) to achieve channel parity. Then, and only thereafter, enhanced surround sound programming (step 40) performs a step of "decoding a surround channel of the matrix mixed audio signal"; after these steps, a "low frequency input channel" is output to a "bass compatible speaker" (step 46), and finally, a "headphone algorithm" is applied to the "matrix mixed audio signal" (step 62).

By observing proper order in the processing steps, identified as "ordered processes" in the language of claim 10, the post processing proceeds without becoming "tinny", "hollow", "clipped", or "choppy," or evidencing unwanted time delays, static, granularity and other sound degradation.

Summary of Claimed Subject Matter as to Independent Claim 17

Claim 17 recites an audio post processing system, which operates generally as shown in Fig. 4 and described in the specification at pages 13-21. Namely, the post processing system includes "at least one decoder" (e.g., within console 26, Fig. 3) that performs a sequence of steps including "matrix mixing" such as downmixing or Prologic algorithms (step 32 or 34, Fig. 4). Then, and only thereafter, (step 40) "decoding a surround channel of the matrix mixed audio signal"; after these steps, a "low frequency input channel" is output to a "low frequency effect compatible speaker" (step 46), then an "ambient noise containing channel" is output "to a speaker system" (step 52), next "center channel equalizing" (step 60). The claim further recites a console (26, Fig. 3) and a signal source (drive 18, Fig. 3).

By observing proper order in the processing steps, identified as "sequenced steps" in the language of claim 17, the post processing proceeds without becoming "tinny", "hollow", "clipped", or "choppy," or evidencing unwanted time delays, static, granularity and other sound degradation.

Summary of Claimed Subject Matter as to Independent Claim 28

Claim 28 recites an audio post processing system, which operates generally as shown in Fig. 4 and described in the specification at pages 13-21. Namely, the post processing system includes "at least one decoder" (e.g., within console 26, Fig. 3) that performs a sequence of steps including "matrix mixing" such as downmixing or Prologic algorithms (step 32 or 34, Fig. 4). Then, and only thereafter, (step 40) "decoding a surround channel of the matrix mixed audio signal"; after these steps, a "low frequency input channel" is output to a "bass effect compatible speaker" (step 46), then a "headphone algorithm" is applied (step 62). The claim further recites a console (26, Fig. 3) and a signal source (drive 18, Fig. 3).

By observing proper order in the processing steps, identified as "sequenced steps" in the language of claim 28, the post processing proceeds without becoming "tinny", "hollow", "clipped", or "choppy," or evidencing unwanted time delays, static, granularity and other sound degradation.

Summary of Claimed Subject Matter as to Independent Claim 29

Claim 29 recites an audio post processing method, generally shown in Fig. 4 and described in the specification at pages 13-21, that performs one of several a sequences of steps enumerated in a Markush group in the claim. The individual steps include

A. "matrix mixing" such as downmixing or Prologic algorithms, are applied (step 32 or 34) to achieve channel parity.

B. Enhanced surround sound programming (step 40) identified as a step of "decoding a surround channel of the matrix mixed audio signal".

C. Output of a "low frequency input channel" to a "low frequency effect compatible speaker" (step 46)

D. Output of an "ambient noise-containing channel" to a speaker system to create a "three dimensional effect" (step 52), and

E. Equalization of a "center channel" from the "matrix mixed audio signal" (step 60).

Each Markush item identifies an order in the processing steps, which are identified as a "sequence" in the language of claim 29. By respecting the order identified in the claim, the post processing proceeds without becoming "tinny", "hollow", "clipped", or "choppy," or evidencing unwanted time delays, static, granularity and other sound degradation.

Grounds of Rejection

Claims 1, 3-9, 17-18 and 20-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paisley (US PAT. 5,530,760) in view of Eid et al. (US PAT. 7,177,432).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paisley (US PAT. 5,530,760) as modified by Eid (US PAT. 7,177,432) applied to claims 1 above and further in view of Vaudrey (US PAT. 6,442,278).

Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paisley (US PAT. 5,530,760).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paisley (US PAT. 5,530,760) in view of Vaudrey (US PAT. 6,442,278).

Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paisley (US PAT. 5,530,760) in view of Shennib (US PAT. 5,825,894).

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paisley (US PAT. 5,530,760)as modified by Eid (US PAT. 7,177,432) applied to claims 17-1 8 above and further in view of Shennib (US PAT. 5,825,894).

Claims 10, 12 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eid (US PAT. 7,177,432).

Argument - Rejections under 35 U.S.C. § 103

In the final rejection, the Examiner has cited, as primary references against independent claims, Paisley U.S. Patent 5,530,760, and Eid U.S. Patent 7,177,432. These references will be discussed herein.

Regarding claims 1, 17, 28 and 29, the Examiner has asserted obviousness under 35 USC 103 based upon Paisley in combination with Eid. However, neither reference discloses the novel features of the claims, specifically, the recitations of the claims that require the sequenced processing of a digitally encoded audio signal.

The sequenced processing of a digital signal is not shown by Paisley for the reason that Paisley does not, in the first instance, relate to a digital signal, but rather is directed to the processing of analog audio signals. Thus, Paisley does not disclose a matrix mixed signal that includes the variety of channels identified in the claim including a "surround channel", "low frequency input channel", "ambient noise containing channel" and "center channel". It should be noted that, Applicant has used the word "discrete" in referring to the channels, establishing that they are separate from each other in the digital format used prior to processing.

Furthermore, the Examiner has not identified how a sequence of digital process steps is shown by Paisley, which clearly does not implement any such steps.

With regard to Eid, the Examiner has asserted that Eid discloses a digital processing system that involves "matrix mixing" a digital audio signal and, subsequently, "outputting a discrete digital low frequency input channel". The Examiner's citation for this disclosure in Eid is "Figs. 1-2 and col. 4 line 1 – col. 5 line 67. However, Applicant can find no such disclosure in the

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cited location. Those locations simply do not mention generation of a discrete digital low frequency channel.

Moreover, and more fundamentally, the Examiner has not identified any citation to Eid or Paisley where the ordering of steps, and specifically the sequential ordering that is explicitly cited in the present claims, is disclosed. As noted in the above summary, ordering of the decoding steps is critical to avoid "hollow" or "tinny" sound, and it is a novel aspect of the present claims that the ordering has been specifically chosen to avoid these effects. Ordering or "sequence" is explicitly required in each independent claim. The Examiner has cited no reference to show or establish ordering of steps as recited in the claims.

With regard to independent claims 10 and 28, the Examiner has asserted unpatentability for obviousness in view of Paisley, taken alone. The Examiner acknowledges that Paisley does not disclose a digital audio signal and applying a headphone algorithm to a matrix mixed audio signal, but the Examiner asserts that doing so would have been obvious. In sum, the Examiner asserts "using an A/D converter to convert the analog signal to digital signal and applying a headphone algorithm to the matrix mixed audio signal are well known in the art (official notice is taken)."

However, the Examiner's assertion of official notice, even if proper (which Applicant does not concede) does not establish the ordering of steps recited in claim 10, specifically, matrix mixing "then" decoding a surround channel "then" outputting low frequency input channels to a bass compatible speaker", "then" applying a headphone algorithm. The Examiner has provided no

citations for where the ordering of the steps, and specifically the sequential ordering in claim 10, is disclosed in any prior art.

The Examiner has also rejected independent claim 10 as unpatentable over Eid, taken alone. Here, the Examiner asserts that Eid teaches an ordered process of matrix mixing, _then_ surround decoding, _then_ low frequency decoding. However, as noted above, the Examiner has not identified any citation to Eid where the ordering of steps, and specifically the sequential ordering in the present claims, is disclosed.

Thus, the prior art cited against the independent claims, Paisley and Eid,, does not relate to the sequenced decoding of a digital, matrix mixed audio signal with at least a surround, low frequency, ambient noise and center channel, Applicant therefore submits that neither Paisley or Eid suggest or anticipate any of independent claims 1, 10, 17, 28 or 29, and the Examiner's rejection thereof must be withdrawn.

With regard to the dependent claims, these are clearly allowable for the reasons set forth above as well.

Accordingly, Applicant submits that the Examiner's rejection is in error and a reversal of the rejection and allowance of the claims is therefore requested.

Respectfully submitted,

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Claim Appendix

1. (previously presented) An audio post processing method for digitally encoded audio, comprising the following sequenced processes:

      matrix mixing a digital audio signal, then

      decoding a discrete digital surround channel of the matrix mixed audio signal, then

      outputting a discrete digital low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker,

      transmitting discrete ambient noise containing channels of the matrix mixed audio signal to a speaker system to create a three dimensional effect, then

      center channel equalizing the matrix mixed audio signal.

2. (Previously Presented) The audio post processing method according to claim 1, wherein matrix mixing the audio signal further comprises applying a downmixing algorithm to the audio signal.

3. (Previously Presented) The audio post processing method according to claim 1, wherein matrix mixing the audio signal further comprises extracting at least four channels from the matrix mixed audio signal.

4. (Previously Presented) The audio post processing method according to claim 1, further comprising driving a centrally-located loudspeaker with a center channel of the matrix mixed audio signal.

5. (Previously Presented) The audio post processing method according to claim 1, further comprising driving a plurality of loudspeakers positioned towards the rear and to the sides of a listener with the surround channel of the matrix mixed audio signal.

6. (Previously Presented) The audio post processing method according to claim 1, further comprising using a bass channel of the matrix mixed audio signal to drive a low frequency effect loudspeaker.

7. (Previously Presented) The audio post processing method according to claim 1, further comprising transmitting ambient noise to a plurality of loudspeakers positioned towards the rear and the sides of a listener.

8. (Previously Presented) The audio post processing method according to claim 1, further comprising transmitting ambient noise to a loudspeaker positioned towards the front of a listener to create a encompassed impression.

9. (Previously Presented) The audio post processing method according to claim 1, further comprising inputting a listener preference and available equipment status into a player console, wherein the listener preference reflects a desired post processing effect.

10. (previously presented) An audio post processing method comprising the following ordered processes:

      matrix mixing a digital audio signal, then

decoding a discrete surround channel of the matrix mixed audio signal, then

outputting discrete low frequency input channels to a bass compatible speaker, then

applying a headphone algorithm to the matrix mixed audio signal.

11. (Previously Presented) The audio post processing method according to claim 10, wherein matrix mixing the audio signal further comprises applying a downmixing algorithm to the audio signal.

12. (Previously Presented) The audio post processing method according to claim 10, wherein matrix mixing the audio signal further comprises extracting at least four channels from the audio signal.

13. (Original) The audio post processing method according to claim 10, further comprising driving the headphone speaker with a center channel of the signal.

14. (Previously Presented) The audio post processing method according to claim 10, further comprising driving the headphone speaker with a surround channel of the matrix mixed audio signal.

15. (Original) The audio post processing method according to claim 10, further comprising transmitting ambient noise to the headphone speaker.

16. (Original) The audio post processing method according to claim 10, further comprising inputting a listener preference and available equipment status into a player console, wherein the listener preference reflects a desired post processing effect.

17. (previously presented) An audio post processing system, comprising:

at least one decoder operable to perform the following sequenced steps:

matrix mixing a digital audio signal, then

decoding a discrete surround channel of the matrix mixed audio signal, then

outputting a discrete low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker,

transmitting discrete ambient noise containing channels of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect, then

center channel equalizing the matrix mixed audio signal;

a player console operable to receive a listener input;

a signal source producing the matrix mixed audio signal comprised of a plurality of discrete channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of positions.

18. (Previously Presented) The audio post processing system of claim 17, further comprising output amplifiers operable to drive a loudspeaker positioned at one or more of the following positions relative to a listener: front, right, left and rear.

19. (Previously Presented) The audio post processing system of claim 17, further comprising output amplifiers operable to drive a headphone speaker.

20. (Previously Presented) The audio post processing system of claim 17, wherein the listener input reflects a listener preference and the disposition of available equipment.

21. (Previously Presented) The audio post processing system of claim 17, further comprising surround sound channel output amplifiers driving loudspeakers positioned towards the rear and sides of a listener.

22. (Previously Presented) The audio post processing system of claim 17, further comprising a center channel equalizer output amplifier driving a loudspeaker positioned towards the front and center of a listener.

23. (Previously Presented) The audio post processing system of claim 17, further comprising a bass channel amplifier driving a low frequency effect loudspeaker.

24. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder utilizes digital cinema sound techniques to direct ambient noise channels of the audio signal to loudspeakers positioned towards the rear of a listener.

25. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder utilizes a virtual enhanced sound algorithm to direct an ambient noise channel of the audio signal to loudspeakers positioned towards the front of a listener.

26. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder creates a center channel of the matrix mixed audio signal for driving a loudspeaker that is centrally located with respect to a listener.

27. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder creates the surround sound channel for ambient noise and for driving two loudspeakers that are located to the right and left behind a listener.

28. (previously presented) An audio post processing system, comprising:

at least one decoder operable to perform the following sequenced processes:

matrix mixing a digital audio signal, then

decoding a discrete surround channel of the matrix mixed audio signal, then

outputting discrete low frequency input channels to a bass compatible speaker, then

applying a headphone algorithm;

a player console operable to receive a listener input; and

a signal source producing the digital audio signal comprised of a plurality of discrete channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of destinations.

29. (previously presented) An audio post processing method comprising performing a sequence selected from the group consisting of:

a) matrix mixing a digital audio signal and decoding a discrete surround channel of the matrix mixed audio signal;

b) matrix mixing the digital audio signal, decoding the discrete surround channel, and outputting a discrete low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker;

c) matrix mixing the digital audio signal and outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker;

d) matrix mixing the digital audio signal, decoding the discrete surround channel, outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting discrete ambient noise containing channels of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect;

e) matrix mixing the digital audio signal, decoding the discrete surround channel, and transmitting the discrete ambient noise containing channels of the signal to the speaker system operable to create the three dimensional effect;

f) matrix mixing the digital audio signal, outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting the discrete ambient noise containing channels of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect;

g) matrix mixing the digital audio signal and transmitting the discrete ambient noise containing channels of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect;

h) matrix mixing the digital audio signal, decoding the discrete surround channel, outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the discrete ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the input signal;

i) matrix mixing the digital audio signal, decoding the discrete surround channel, and center channel equalizing the matrix mixed audio signal;

j) matrix mixing the digital audio signal, outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal;

k) matrix mixing the digital audio signal, transmitting the discrete ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal;

l) matrix mixing the digital audio signal, decoding the discrete surround channel of the matrix mixed audio signal, outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal;

m) matrix mixing the digital audio signal, outputting the discrete low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the discrete ambient noise containing channel of the matrix mixed audio signal to the

speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal; and

n) matrix mixing and center channel equalizing the matrix mixed digital audio signal; wherein matrix mixing always precedes decoding the surround channel, outputting the low frequency input channel, transmitting the discrete ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, wherein decoding the surround channel of the audio signal always precedes outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, wherein outputting the low frequency input channel always precedes transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, and wherein transmitting the discrete ambient noise containing channel always precedes center channel equalizing the matrix mixed audio signal.

Evidence Appendix

None

Related Proceedings Appendix

None

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